

U.S.S.N. 10/730,353
Req. for Recon and Decl w/ RCE

MAY 01 2007

May 01, 2007

REMARKS

Instant claims 1-4, 8-10, and 18-19 stand pending in the instant Application.

Amended Declaration Pursuant to 37 C.F.R. §1.132

Concurrently herewith, Applicants have submitted an Amended Declaration because of a typographical error in the April 4, 2007 Declaration (see below). The Amended Declaration, dated May 01, 2007 supercedes and replaces the earlier dated Declaration of April 4, 2007.

Claim Rejections: 35 U.S.C. §102(b) and 35 U.S.C. §102(e)

Claim 18 is rejected under 35 U.S.C. §102(b) as being anticipated by Ma *et al.* (U.S. 6,247,808), hereafter "Ma". Claims 18 and 19 are rejected under 35 U.S.C. §102(e) as being anticipated by Dersch *et al.* (U.S. 6,492,451), hereafter "Dersch". Claims 1-4, 6, 8-10, and 18-19 are rejected under 35 U.S.C. §102(e) as being anticipated by Edwards *et al.* (U.S. 7,101,921), hereafter "Edwards". Applicants respectfully traverse these rejections for at least the following reasons.

Each of the cited references fails to disclose a polymer composition comprising aqueous emulsion polymer particles comprised of polymerized units of phosphorus acid monomer having first phosphorus acid groups and a water soluble polymer having second phosphorus acid groups, the particles comprising a ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups of less than or equal to 1.5, as instantly recited. Further, each reference fails to disclose emulsion polymerization to make a polymer comprising phosphorus acid monomer at a pH of less than 2, as instantly recited. In contrast to all of the cited art, emulsion polymerization of phosphorus acid monomer at a pH of less than 2, as instantly recited, provides emulsions of polymer particles defined by such a ratio. See, for example, page 12, line 27, to page 13, line 15 of the instant specification and Example 1 at the paragraph bridging pages 26 and 27.

For the reasons shown below, the enclosed Rule 132 Amended Declaration of inventor Ward Brown shows that a polymer made by the closest art disclosed fails to meet the instantly recited ratio of equivalents of second phosphorus acid groups to

May 01, 2007

equivalents of first phosphorus acid groups of less than or equal to 1.5. Accordingly, Ma, Dersch, and Edwards, each fail to inherently include each and every feature of the instant invention and each fails to disclose each and every feature of the rejected claims. As these references do not anticipate the claims, the rejections should be withdrawn.

Addressing the grounds of rejection set forth in the Advisory Action of April 20, 2007:

(i) Allegation that Declaration of Ward T. Brown is not commensurate in scope with Dersch et al. is incorrect

(a) Method of adding in initiator and monomer is the same in each of the Declaration of Ward T. Brown and in the art of Dersch

There is a typographical error in the Declaration of Ward T. Brown dated April 4, 2007. The monomer emulsion and initiator solution were added in an identical manner to that of Dersch. Applicants have submitted an amended declaration to correct the typographical error. See the Amended Declaration dated May 01, 2007 at item 5, 2nd full paragraph.

(b) The solids content of the emulsion polymers in each of the Declaration of Ward T. Brown and in the art of Dersch is the same, and is, at the very least, irrelevant to the claimed ratio of first phosphorus acid groups to second phosphorus acid groups

Dersch reports solids of 58.2% for Dispersion D1. The repeat preparation of D1, as described in the Declaration, reported 56.5% solids. One skilled in the art would recognize that the solids of an emulsion sample does not affect determination of the ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups. In fact, the calculation of the ratio of phosphorus acid groups washes out entirely because the emulsion solids is present in both the denominator, as a serum proportion (page 6, line 7 of the Declaration of April 04, 2007), and in the numerator, as a monomer solids proportion (page 6, lines 8-9 of the Declaration of April 04, 2007). Emulsion solids is, thus, irrelevant to the ratio in question.

In another example, diluting the dispersion by adding more water would change the solids, but would not alter the ratio of equivalents of second phosphorus acid groups to

MAY 01 2007

U.S.S.N. 10/730,353
Req. for Recon and Decl w/ RCE

May 01, 2007

equivalents of first phosphorus acid groups. This ratio is determined during the polymerization process and not by the solids content of the emulsion.

Still further, the reported difference in solids is within the normal standard deviation associated with an emulsion polymerization reaction. In fact, the difference is close to that difference which one would expect from the error in the solids determination alone.

(c) The pH of the emulsion polymers is the same in each of the Declaration of Ward T. Brown and in the art of Dersch

Dispersion D1 in Dersch was adjusted to pH 7.3 following the polymerization, whereas the dispersion of the repeat preparation, as described in the Declaration, was adjusted to pH 7.4. First, to one skilled in the art, these numbers are indistinguishable (the pH meter is not reliably more accurate than 0.1 pH unit). Second, while the pH during the polymerization process impacts the amount of phosphorus acid monomer incorporated into the latex particle versus the water soluble polymer, the adjustment of the pH after the polymerization is complete does not affect determination of the instantly recited ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups. See (ii) below.

Conventionally, as in Dersch (and Ma and Edwards), the polymerization is run without adjusting the pH. Even in the presence of the acid monomers, this means that Dispersion 1 of Dersch is run at a pH of at least ~2.5 or higher. Adjusting the pH upward after the completion of the polymerization does not affect the polymerization process or the ratio in question, and the pH range of ~7.3 – 7.4 is not close to any critical pH with respect to the determination of the monomer distribution (first phosphorus acid groups versus second phosphorus acid groups). Thus the difference in the adjustment of the pH, after completion of the polymerization, to a pH of 7.4 in the current repeat preparation versus a pH of 7.3 in Dersch, has no relevance to the instantly recited ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups.

(ii) Allegation that Declaration of Ward T. Brown does not compare with the "closest" polymer of Dersch is incorrect

In polymerization at the instantly recited pH, the pH is below the pKa of the phosphorus acid monomer and the phosphorus acid monomer is therefore protonated,

May 01, 2007

so the acid monomer is not electrostatically charged. The uncharged (neutral) monomer can be incorporated into the polymer particle and the reaction kinetics favor incorporation and polymerization in the growing latex particle, as opposed to out in the aqueous phase. See, for example, specification, page 13, lines 6-15.

By contrast, in polymerization as performed in the cited art, the vast majority of the phosphorus acid monomers are polymerized in the aqueous phase (instead of in the polymer particle) and result in water soluble polymers (as opposed to incorporation into the growing latex polymer particle). When the polymerization pH is above the pKa of the acid monomer and the acid monomer is therefore deprotonated as in the cited art, the monomer is a negatively charged species. Incorporation of the deprotonated negatively charged monomer into the negatively charged latex disperse phase is disfavored by repulsive force. Moreover, adding relatively more of the monomer *would actually insure that an even greater ratio of the deprotonated (phosphorus acid) monomer will be incorporated in the water soluble polymer of the aqueous phase of the emulsion.* Additionally, because the negatively charged acid monomer of the cited art is more soluble in the aqueous phase, polymerization is favored in the aqueous phase leading to the water soluble polymer (having second phosphorus acid groups). Thus, the closest polymer from Dersch is the one that adds less phosphorus acid monomer into the monomer mix; i.e. Dispersion D1 is the closest polymer from Dersch because it attempts to incorporate a smaller quantity of the phosphorus acid monomer than Dispersion D2 (~1.1% vinylphosphonic acid in D1 vs. ~1.6% vinylphosphonic acid in D2). See the Amended Declaration dated May 01, 2007 at item 4, page 3.

(iii) The attempted recalculation of the demonstrated ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups, on page 4 of the Advisory Action dated April 20, 2007 is incorrect

Contrary to the position taken in the rejections, the Declaration of Ward T. Brown does not state (on page 6) that the solids content of the polymer emulsion impacts the ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups. That factor can be used in the calculation of the ratio, but does not determine what the ratio will be (chemically, for the reasons outlined in item (ii) above; mathematically, as shown below).

May 01, 2007

The rejection mentions both an increase in solids content and the addition of a higher quantity of phosphorus acid monomer. The higher quantity of phosphorus acid monomer would increase the weight of polyvinyl phosphorus acid charged (page 6, lines 5-6 of the Declaration of April 04, 2007) and thus the amount of polyvinyl phosphonate to which the acid corresponds (page 6, lines 10-12 of the Declaration of April 04, 2007). Solids content is irrelevant, as the change in quantity of phosphorus acid monomer proportionally increases the solids content of the emulsion composition (page 6, lines 5-8 of the Declaration of April 04, 2007), i.e. to the same extent the amount of phosphorus acid monomer is increased; and solids content or change therein does not itself impact the ratio of monomer incorporation into latex particle versus the monomer polymerized into the aqueous phase. See item (i)(b), above.

Contrary to the position taken in the rejections, the increased amount of polyvinyl phosphorus acid added will increase the amount of phosphorus acid monomer polymerized in both the aqueous phase and in the latex emulsion particle, and not just the amount of phosphorus acid monomer polymerized in the latex emulsion particle. See item (ii), above. Inexplicably, the rejection offers no explanation or support for the position that *all* of the additional phosphorus acid monomer in Dispersion D2 would go into the latex emulsion particle. Increased amount of polyvinyl phosphorus acid added results in a greater NMR peak for the polyvinyl phosphonic acid, sodium salt, at 10.8 ppm for the serum phase sample (365.03 increases at page 6, line 6 of the Declaration of April 04, 2007)). Moreover, as pointed out above, an even greater proportion of the monomer fails to incorporate into the latex emulsion particle when adding a greater amount of the charged species to an increasingly charged latex particle. See item (ii), above and the Amended Declaration dated May 01, 2007 at item 4, page 3. Thus, an even greater amount of the polymerization occurs in the aqueous phase giving relatively more of the undesirable water soluble polymer.

Mathematically, the weight of polyvinyl phosphonate in the 10g serum (second phosphorus acid groups) shown on page 6, lines 2-3 of the Declaration of April 04, 2007 increases (i.e. 365.03 increases, and thus 0.2005g increases). Thus, a larger number than 0.2005 must be subtracted from the total charged, in line 10 on page 6 of the Declaration of April 04, 2007. Accordingly both numbers in the final ratio used on

May 01, 2007

page 4 of the rejection in the Advisory Action of April 20, 2007 are in error; the numerator would be larger, and the denominator smaller, both of which move the overall ratio higher; not just higher than the rejection contemplates, but higher than 50.6. The calculation offered is in error.

(iv) The Declaration with Respect to Edwards

Edwards does not disclose any examples with phosphorus acid monomers. In fact, one would have to pick and choose from the disclosure of Edwards to arrive at examples like Dispersion D1 of Dersch; and, it is improper to require comparison of the invention of the instant claims to any embodiment not actually disclosed in the art. For example, Edwards fails to suggest any but a conventional two-stage polymerization process. See Edwards at col. 6, lines 40-60. Thus, one can deduce only that the Edwards emulsion polymerization is run conventionally. Accordingly, one cannot say that Edwards's examples are the closest prior art, and the comparison on the record properly addresses the closest art.

Further, Dispersion D1 of Dersch is polymerized over a seed polymer, meaning that Dispersion D1 of Dersch is chemically indistinguishable from a two-stage polymerization process. See Dersch at col. 12, line 55 to col. 13, line 49. Accordingly, the rejection lacks any basis for holding the Declaration of Ward T. Brown to lack probative value in relation to Edwards.

In any case, phosphorus acid monomers in a first stage monomer emulsion do not get a second chance for incorporation during the second stage polymerization; they are either incorporated into the growing latex polymer particle or they polymerize in the aqueous phase to give water soluble polymers. In general, the thus formed water soluble polymers do not have sites of unsaturation and are not further polymerized into the latex particle. Further, phosphorus acid monomers added in the second stage monomer emulsion experience no different scenario to that of a one-stage polymerization. The factors that control incorporation of the phosphorus acid are the same in one-stage and two-stage polymerizations.

The Applicants have repeated the work of the closest prior art reference, Dispersion D1 in Dersch, and have shown that Dersch fails to meet the instantly recited ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid

May 01, 2007

groups of less than or equal to 1.5. See Declaration of Ward T. Brown, May 01, 2007, Items 5 and 6. It is clear to one skilled in the art that the relative phosphorus acid monomer incorporation into a latex polymer particle are the same in Dersch as they are in two-stage polymerization, and thus the showing in Dersch is equally representative of the showing in Edwards. This is especially true given that there is no polymer preparation that incorporates phosphorus acid monomers that can be followed from the work of Edwards.

Double Patenting

Claims 1-4, 6, 8-10, and 18-19 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of Application Serial No. 10/642,791 in view of Dersch *et al.* (U.S. 6,492,451). Applicants respectfully traverse these rejections.

Application Serial No. 10/642,791 and the instant application are commonly owned at the time the invention was made. See the Statement of Common Ownership in the Response dated April 4, 2007. Further, Dersch fails to meet the instantly recited ratio of equivalents of second phosphorus acid groups to equivalents of first phosphorus acid groups of less than or equal to 1.5, or polymerization at a pH of less than 2 that gives such a ratio. See Declaration of Ward T. Brown, May 01, 2007, Items 5 and 6. Thus, Dersch, taken alone or in combination with other references, fails to meet all of the features of the instant claims and fails to render the instant claims obvious. Accordingly, the rejections should be withdrawn.

CONCLUSION

Based on the foregoing, the instant claims are believed to be in condition for allowance. Applicants' attorney thanks the Examiner for the time taken to review this response and Declaration.

Enclosed herewith, please find the Amended Declaration of inventor Ward Brown under Rule 132.

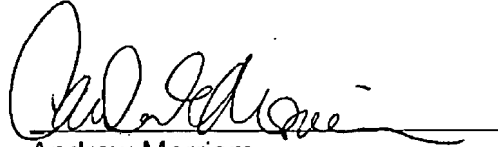
U.S.S.N. 10/730,353
Req. for Recon and Decl w/ RCE

May 01, 2007

Concurrently herewith, Applicants have filed a Request For Continued Examination under Rule 1.114.

The Applicants request early and favorable action, including allowance of claims 1-4, 8-10, and 18-19 in light of the foregoing remarks.

Respectfully submitted,



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May 01, 2007
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